

Assessment of the Rat Cove fish community, summer 2001

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INTRODUCTION

The fish community of Rat Cove has been monitored regularly beginning in 1979, with a study done by Austin et al. (1980). Methods of capture have varied throughout the years, with all including the use of trap nets.

Rat Cove is a littoral embayment on the west side of Otsego Lake, Otsego County, New York (Figure 1). The purpose of this study is to compare the present fish community with those observed in past years. Effects of introduced species, such as the alewife (*Alosa pseudoharengus*) and walleye (*Stizostedion vitreum*), can be evaluated from this study. The alewife was introduced illegally in 1986 (Foster, 1989) and has since experienced an explosion in population size. In turn, authorized stocking to reintroduce walleye took place in 2000 and 2001, the rationale being that this gamefish would successfully utilize the forage base provided by the alewife. Current studies are underway to evaluate the success of that stocking program (McDonnell, 2002), as well as to assess any lake-wide trophic changes that may result from alewife reduction (Cornwell, in prep.). Characteristics that are being compared include fish length, weight, species dominance, and abundance fluctuation throughout the summer.

METHODS AND MATERIALS

A single trap net on the north shore of Rat Cove (Figure 1) was used to assess the fish community during the summer of 2001. This method was used in order to be consistent with the capture and assessment methods of previous years (Ingalls, 1998; Warner, unpubl.; Meehan, 2001).

Trap nets were set according to Hubert (1996) Monday through Thursday from 29 May to 16 August. The nets were pulled Tuesday through Friday at 24-hour intervals. Fish caught were identified, weighed to the nearest gram and measured to the nearest millimeter. All fish, with the exception of alewives, were returned to the lake immediately after having been identified, weighed, and measured. Any alewives caught were taken back to the Biological Field Station to be weighed more accurately. Since alewives tend not to survive after being released, no such attempt was made.

RESULTS AND DISCUSSION

According to trap net data, the Rat Cove fish community consists of thirteen species of fish, with abundance fluctuating throughout the summer months (Figure 2). Upon comparison with data from previous years, many shifts in community

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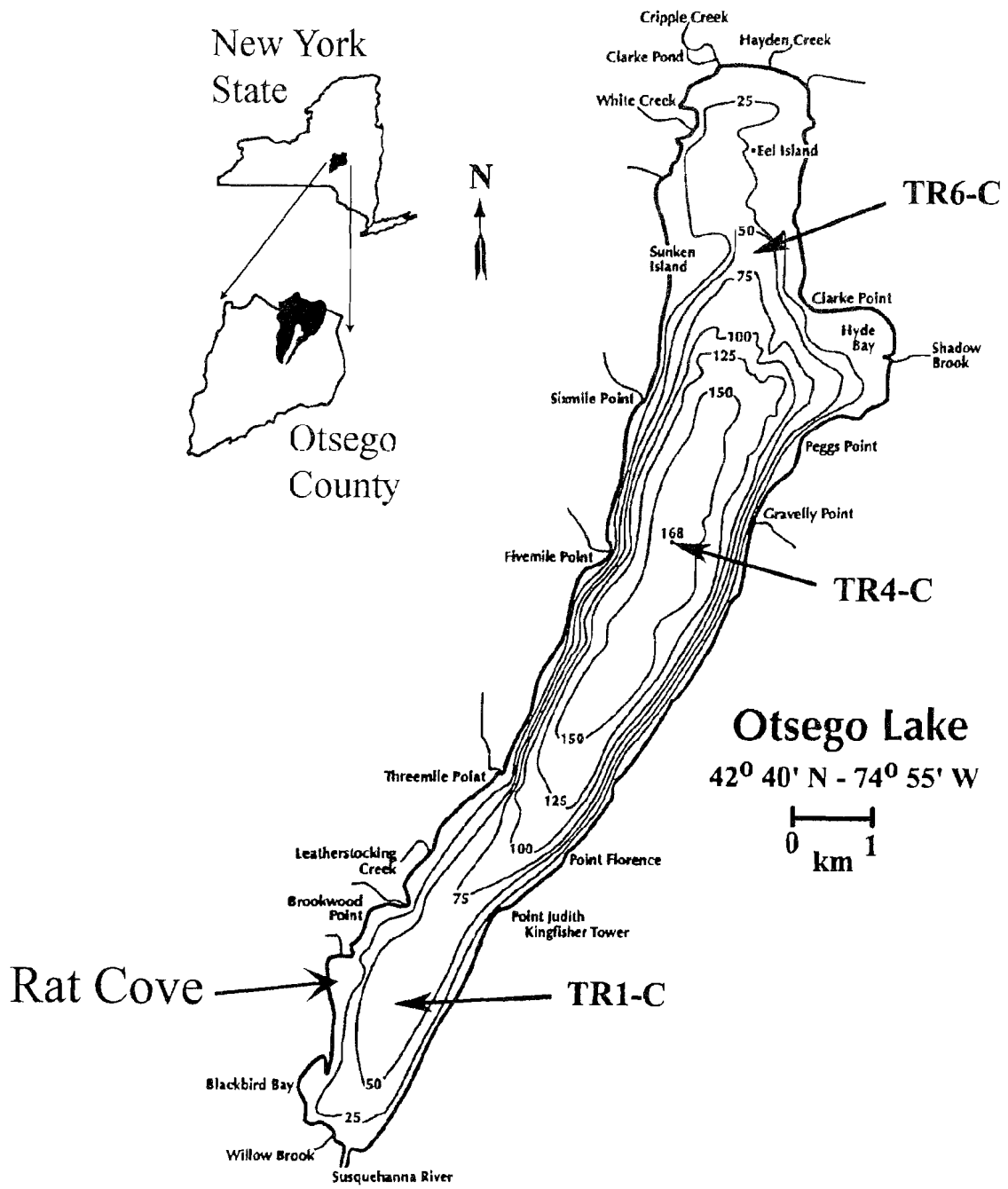


Figure 1. Otsego Lake, NY, showing the study site (Rat Cove).

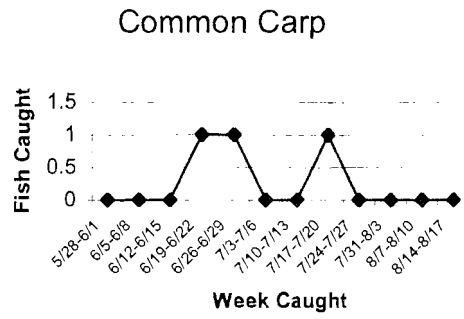


Figure 2a

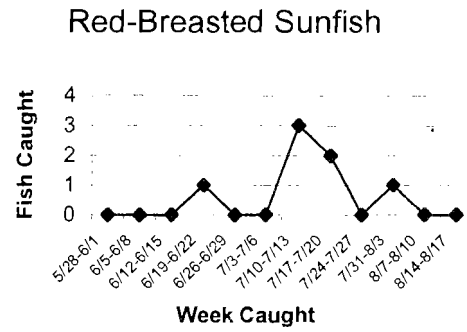


Figure 2b

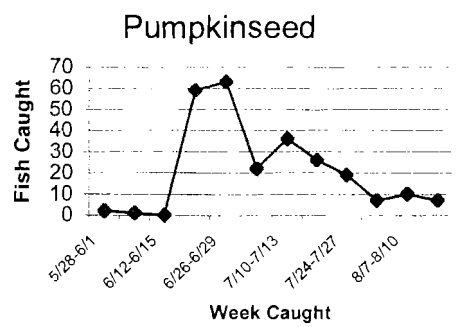


Figure 2c

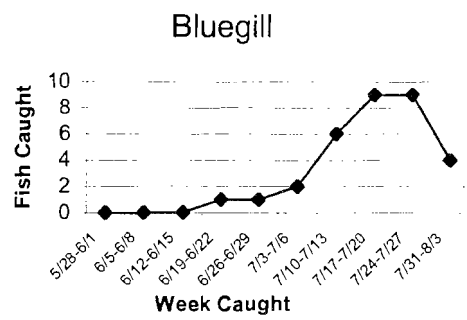


Figure 2d

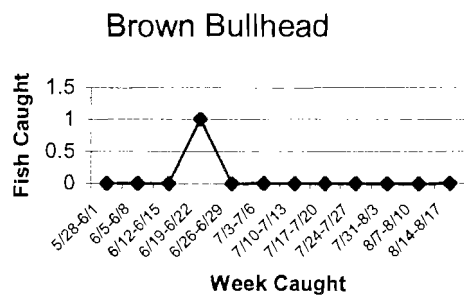


Figure 2e

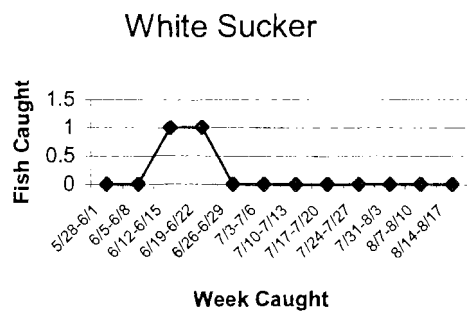


Figure 2f

Figures 2a-2f. Weekly fluctuation of species abundance.

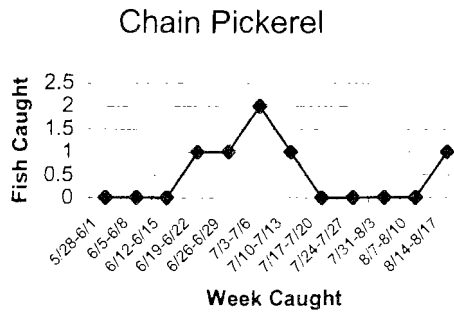


Figure 2g

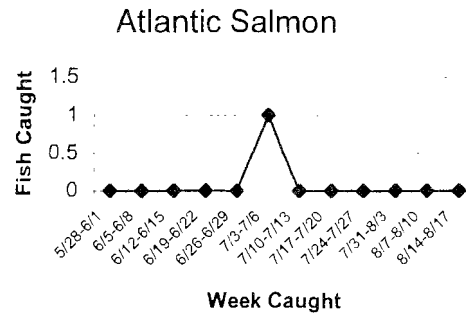


Figure 2h

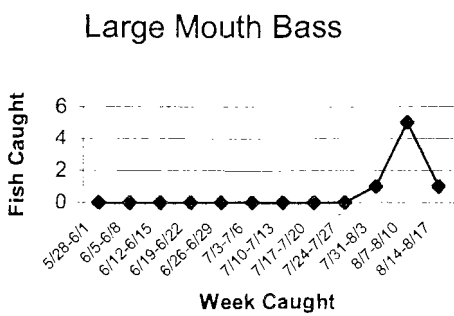


Figure 2i

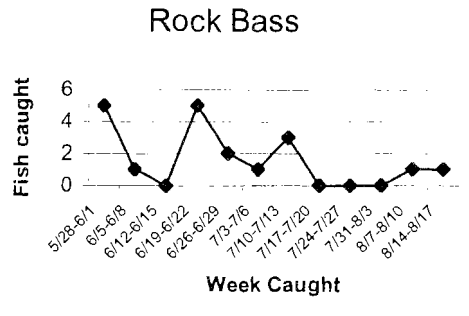


Figure 2j

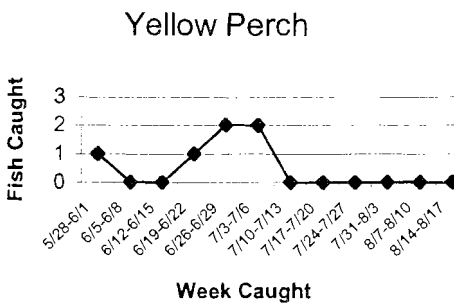


Figure 2k

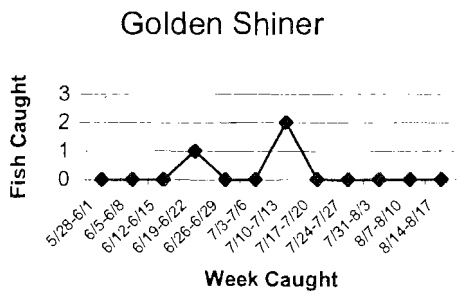


Figure 2l

Figures 2g-2l. Weekly fluctuation of species abundance.

characteristics are apparent as drastic changes in percent composition of the Rat Cove community have occurred since the summer of 2000 (Table 1), the most pronounced being within the alewife and pumpkinseed populations. The alewife population has decreased from 85 percent in 2000 to 70 percent of the total catch in 2001, while the pumpkinseed (*Lepomis gibbosus*) population has increased from 6.9 percent in 2000 to 21.7 percent of the total community. These changes are significant when assessing effects of the attempted control and reduction of the alewife population, and are consistent with acoustic studies performed in summer-fall 2000 (Cornwell, in prep). Such a decrease in the alewife population seemingly suggests that the method of control (increased piscivory due to walleye stocking) is effective. However, a fall 2000 electrofishing survey suggests that stocked walleye survival that year appeared to be insufficient to be responsible for the alewife decline (Cornwell, in prep).

Continuation of monitoring over the next few years is necessary in order to more fully understand the effects of the walleye stocking on the alewife population that is returning to the littoral zones to spawn each year. Other factors that should be evaluated as the number of alewives change include the numbers of other planktivores, such as the golden shiner (*Notemigonus crysoleucas*) and European rudd (*Scardinius eruthrophthalmus*), which also spawn in Rat Cove to. With less competition from Alewives, these other planktivorous species could establish themselves for more successful spawning once again in the cove.

	1997	1999	2000	2001
Mean Catch per Week			141	96
Alewife	54.53	79.56	85.18	70.57
Golden Shiner	2.23	0.48	0.42	0.26
European Rudd	0.22		0.06	
Pumpkinseed	12.11	11.09	6.9	21.69
Bluegill	22.73	3.33	1.4	3.01
Red Breasted Sunfish	0.98		0.6	0.6
Rock Bass	1.57	1.27	1.1	1.64
Large Mouth Bass	0.07		0.06	0.6
Chain Pickerel	0.1	0.63	0.42	0.52
Atlantic Salmon				0.09
Yellow Perch	2.13	2.06	1.8	0.52
White Sucker	0.54		0.66	0.17
Common Sucker			0.06	
Common Carp	0.17	0.48	0.18	0.26
Brown Bullhead	2.64	0.16	1.2	0.09
Blunt Nose Minnow		0.95		

Table 1. Percent of the total trap net catch in Rat Cove in the summers of '97, '99, '00, and '01.

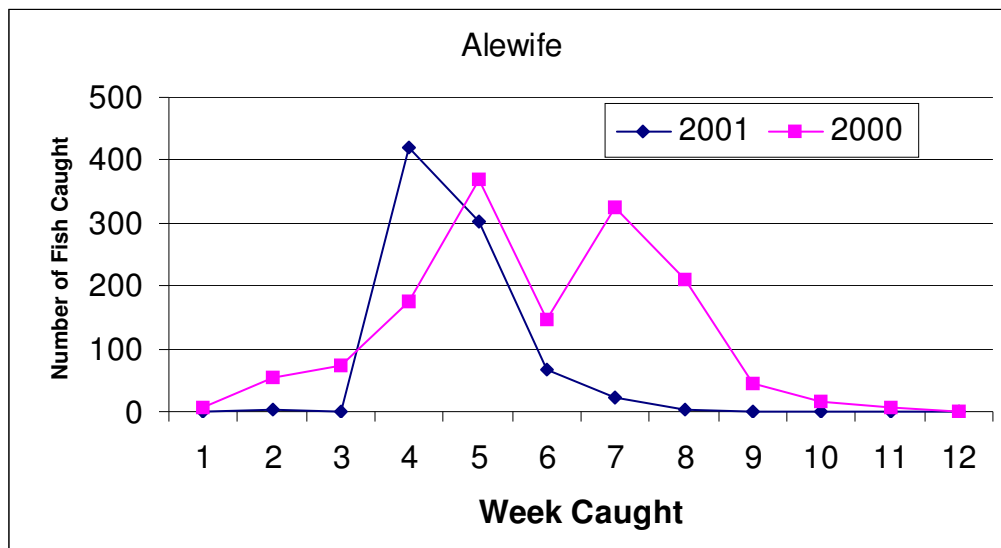


Figure 3. Alewife abundance fluctuations for 2000 and 2001.

Another change seen in the alewife population this summer deals with the number of peaks in abundance (Figure 3). These peaks reflect spawning activity. Observations in 1997 (Ingalls, 1998) show that there was only one peak in alewife abundance, which was also the case in the summer of 2001, whereas in 2000 (Meehan, 2001) there were two peaks. Abundance fluctuations are not available for 1998 data. Future monitoring is necessary in order to determine whether or not there is a pattern to these increases in abundance. Changes in the dates of these peaks are most probably due to differences in weather from year to year; however, the reason for the variance in the number of peaks seen is unknown. Length versus weight trendlines (Figures 4-5) were created to illustrate growth patterns for species sampled, showing that as fish grow older, growth in length slows while the weight increases. Findings in the summer of 2000 showed a diversion in the alewife's length versus weight trend line (Figure 4b), while the trend line for alewives in the summer of 2001 (Figure 4c) shows none. The diversion in 2000 correlates with the two peaks in abundance shown, and so a connection is thought to exist there. The fish coming in to spawn in the second peak of the summer would be approximately the same length as those in the first peak, but the weight would be much higher. This would be so because the fish are farther along in the growing season, there is more plankton available for consumption, and they are full of eggs and sperm for spawning. The abundance peaks for most other species occurred somewhat earlier this summer than were reported for the summer of 2000, most likely due to the higher temperatures that were experienced this summer.

In the summer of 2001, more pumpkinseeds were caught, with some that were larger than those caught in the previous year (Figure 5b). The data taken on these fish reinforce the idea that as fish grow older, weight increases at a far greater rate than does

the length. This was also seen in the rock bass population where there is an apparent decrease in growth rate as the fish grow larger.

Length Frequency histograms (Figure 6) for the pumpkinseed and bluegill populations reflect recruitment, mortality, and approximate age classes, providing an overview of the state of the population of each species based solely upon trap net sampling. For instance, a profile of a population of a species such as the pumpkinseed, whose whole life cycle is completed within the cove, can be created through the use of length frequency histograms. The number of age classes present within the population can be evaluated based on increases in the numbers of individuals of certain lengths, as seen in figure 6a. The smaller fish indicate recruitment for the pumpkinseed population, with the numbers dropping off considerably as they age and die. Figure 6a indicates that there are higher numbers of older fish than younger fish, implying that the population is in decline. However, figure 7d indicates an increase in population based on the pumpkinseed's percentage of the total catch. Based on these findings, it can be concluded that the trap net inadequately samples young age classes. Conversely, the alewife population that is sampled in Rat Cove consists mainly of fish ranging in length from approximately 120mm to about 145mm (Figure 6c), reflecting the average size of the spawning adult fish in the population. For most species there were not enough fish caught to make an effective length frequency histogram.

CONCLUSION

The Rat Cove fish community reflects the status of warm water fish communities in other littoral areas around the lake, and can be used to monitor changes in the lake as a whole. Changes in the community composition have shown a rebound in the number of sunfishes and a decline in the number of alewives coming to the cove to spawn. With further monitoring where weather conditions are examined, patterns and trends dealing with the yearly fluctuations in the abundance of certain species can be more fully understood.

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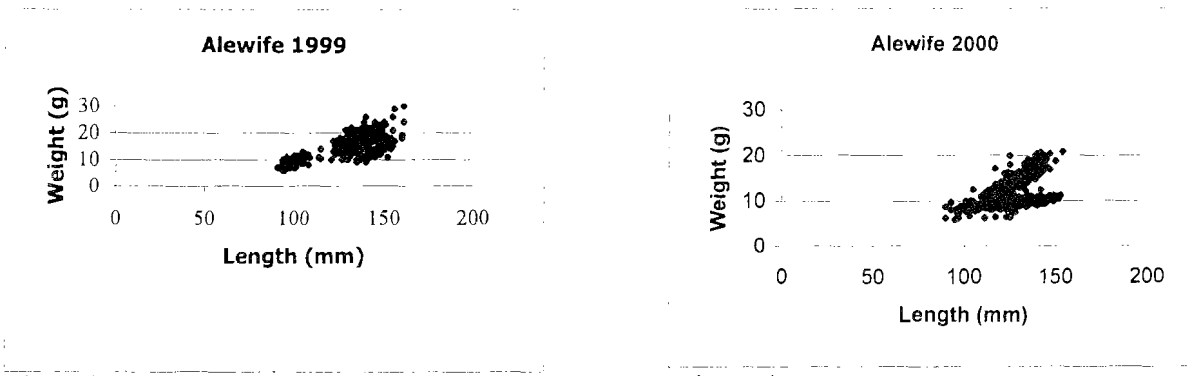


Figure 4a

Figure 4b

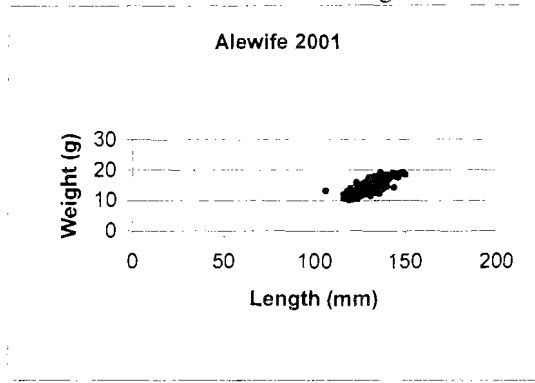


Figure 4c

Figures 4a-4c. Length to weight trendlines for alewives in 1999, 2000, and 2001.

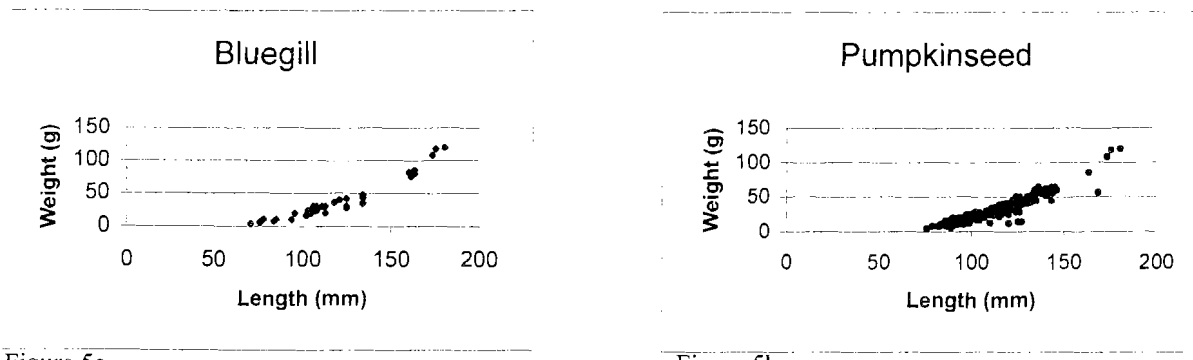


Figure 5a

Figure 5b

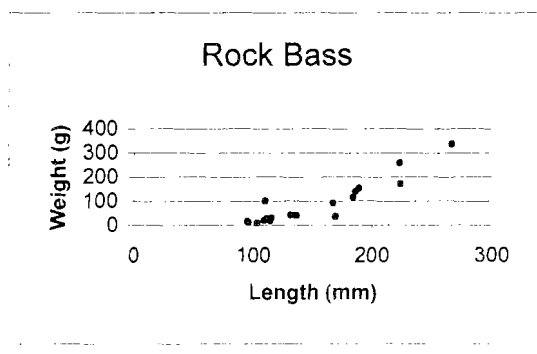


Figure 5c

Figures 5a-5c. Length to weight trendlines for observed species.

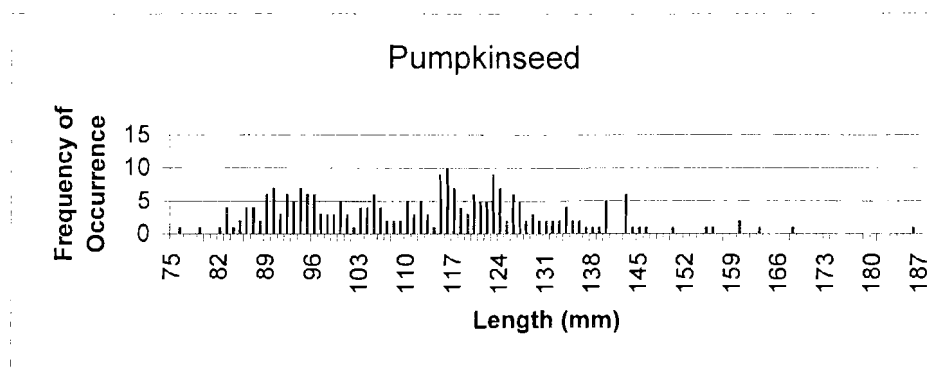


Figure 6a

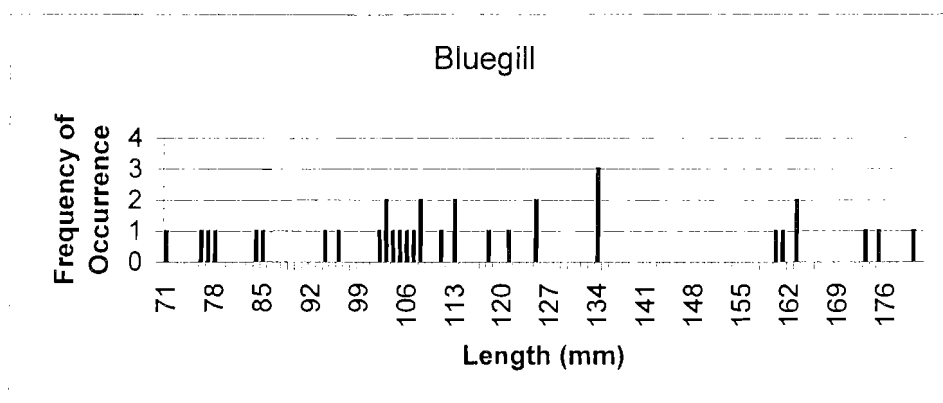


Figure 6b

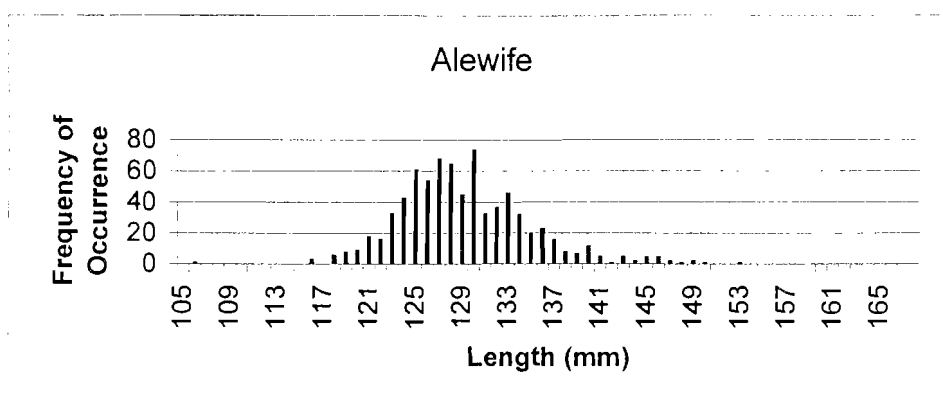


Figure 6c

Figures 6a-6c. Length frequency for selected species.

MacWatters, R.C. 1980. The Age and Growth of Selected Fish Species in Otsego Lake, Cooperstown, NY. *In* 12th Ann. Rept. (1979) SUNY Oneonta Bio.Fld. Sta., SUNY Oneonta. pp. 18-28.

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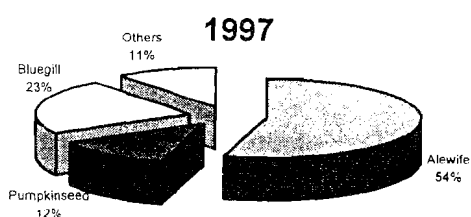


Figure 7a.

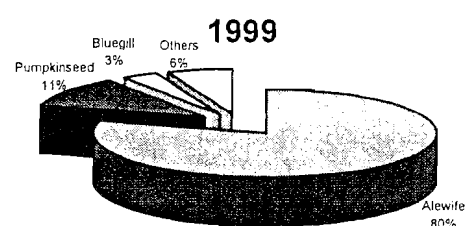


Figure 7b.

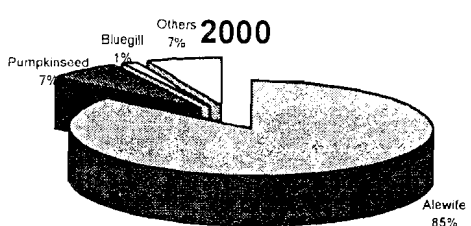


Figure 7c.

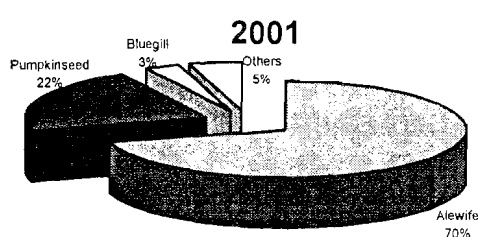


Figure 7 d.

Figures 7a-7d. Changes in the Rat Cove fish community composition from 1997 to 2001.

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